and also best realize the opportunities presented by those technologies.

It is interesting that engineers sometimes make very good attorneys, largely because the though process of engineering and law can be very similar in terms of problem solving.

Unfortunately, I think all to often when we are designing regulatory regimes we sort of forget that when you are going through an engineering process you define the problem, you define the solution, you see if the solution works and you go back and you change it if it doesn't so you can reach the goal of actually answering the question you started from.

All too often in the regulatory space, unfortunately, you end up defining the problem, somebody figures out okay, well we'll just regulate it this way, or we'll have this program.

And then by the time you get around to figuring out whether or not that program has actually worked, or whether that solution has actually worked, you are two or three years down the road.

And if it's not working, it's extremely difficult to actually change it to make it work. So, getting it right at the beginning is extremely important, and also being willing down the road to be

flexible in the approach and adopt new solutions as they come up is also very important.

So I'm extremely excited that we have the speakers that we have today on the panel. I think we really do have a panel that represents perhaps an aggregate of over 100 years of experience in this field, which is not individually, but, you know, each one adds up.

And I think you will find that the speakers have an enormous wealth of experience to share with us today. We are going to start with comments from Ed Bosson, who is widely regarded as the father of video relay service.

He has been the relay Texas administrator since 1990. In this capacity he manages the relay and associated expenses for the state of Texas. He has won numerous awards for his efforts in this area, including awards from the Texas Associated of Deaf Recognition Award, the Robert H. Weitbrecht Telecommunication Access Award from Telecommunication for the Deaf Inc.

He has also received TDI's 30th Anniversary Recognition Award where he was recognized as one of the 30 individuals who have produced the greatest impact on telecommunications accessibility for

America's deaf and hard-of-hearing citizens. So I welcome Mr. Bosson into the panel.

MR. BOSSON: Thank you. We will be talking about the impact of network services on VRS. As a result of the internet relay and VRS, there has been a paradigm shift that I would like to share with you.

Obviously, TTY users are now migrating to VRS and internet relay services, and the call volume of traditional relay services has either plateued or decreased as a result of this migration.

TRS, traditional relay services, are now rethinking how to define their services because of what's going on in the internet services provided. And those internet services have provided challenges to meeting the TRS guidelines.

Functional equivalency, I know it's been discussed and analyzed, and rediscussed, but I'd like to really emphasize that functional equivalency should be based on the senses and how those services are accessed via the sense.

Hearing people use a telephone with a voice and hearing. And that gives them access very easily. Deaf people use sight as their sense of communication access.

And so they depend on sign language and that

visual access. So the different services we have, like VRS, it isn't a Cadillac for deaf people, it's really just a basic service that provides functional equivalency to that which is already out there for other users.

Also, these new changes are affecting interpreters. Interpreters used to have to go from place to place to do their work and interpret for people.

But now interpreters are taking on desk-bound work. Many interpreters never predicted that would happen to their industry. But it is happening as they work in VRS call centers.

More and more deaf people are having access to computers in their homes. And so they are using internet relay and video relay services. And it is making it easier for them to communicate.

And they are not using TTYs anymore. And we have already seen several deaf people talk about how TTYs are, you know, being thrown out and land lines are being cut off, that they are focused on only the internet services that they are able to access at this time.

Internet services will require different rules and regulations. Average speed of answer is one

that that's being affected, you know. We need to determine how quick it needs to be answered, you know.

The different internet speeds that people are connecting with, you know. So the regulations need to come up with a fair result of, you know, cost of service and quick speed of answer.

Also identifying callers, the originating caller and the terminating caller, how to identify callers. Should that be required? Or should that be a service that isn't required anymore?

Should the regulations require internet capable services have logins and password protection to minimize some of the fraud cases that we are now experiencing?

The question has come up about the funding source for those internet services. Should they be moved back to the state level or maintained at the Federal level?

I'd like to really emphasize that the funds are collected -- the money is collected from the carriers. And the carriers collect from the rate payers.

And so really, in essence, whatever we call it, the rose is still going to smell the same. Okay? Whether it is Federal or State. On that basis I

believe the Federal Government should study which would be the most cost-effective and the most accessible, provide the most access and be the most fair, not only to the phone companies, but to the rate payers.

Because those are the people who are ultimately paying for this service. So if we looked at it on a Federal sponsorship level, I would encourage the FCC to look into Federal funding support for internet relay and VRS completely.

I think it is more cost effective. It will distribute the costs more evenly to all of the carriers, and as a result of that to all of the rate payers.

All of the payments that they make will be equalized. If it was pushed onto the states that they had to pay for internet and VRS services, competition would only happen at the RFP level.

Vendors tend to hold back new technology and new ideas and wait until RFPs come, and they put them in, in hopes to win over their competition. So at that different level it puts, at the Federal level, there's more competition available, rather than limiting it to a single source at the state level.

If it is pushed down to the state level

there most often isn't a multi-vendor approach. The RFP approach normally chooses one vendor for the state.

They establish a contract. And deaf people then are limited in the choices that they currently experience. Price per minutes depend on the call volume histories for those states.

And in the RFP that get sent out, a vendor will look at that state and say well if you have a call volume the price per minute will go down. But if it's a low call volume then the price goes up per minute.

And so then that cost is pushed back to the rate payer, depending on which state you live in. If the states did decide to go ahead and take a multi-vendor approach, the cost would then be much higher then if it's done on a Federal level.

What you see here on the screen, all of these new things we have coming up, in itself contribute to a reduction of the call volume of traditional relay services, which is a good thing, actually.

In conclusion, VRS and IP relay needs to be subsidized by the National fund. There should be special regulations that are separate from traditional

relay service regulations because of internet accessibility.

It's not unlike what the FFC is doing right now with VoIP, developing new regulations and new protocols. The same thing needs to happen with internet relay and VRS services conducted over the internet.

Functional equivalency needs to be taken a hard look at and redefine functional equivalency. It needs to be redefined in a way that will be more fair to deaf people. Thank you very much.

MR. CARLISLE: All right, our next panelist is Dr. Paul Michaelis, who is a consulting member of the technical staff in Avaya Labs, and an adjunct professor in the Cognitive Science Institute at the University of Colorado in Boulder.

He is the inventor, or co-inventor, of many Avaya accessibility solutions. He currently has over 15 patents, or patents pending in this area. He is the recipient of the Access Innovation Award from the Association of Access Engineering Specialists for his development of the TTY user interface for the Intuity messaging system.

He was a member of the Lucent Intellectual Property Board of Advisors, and a distinguished member

of the technical staff of Bell Laboratories. We are very pleased to have him with us here today.

MR. MICHAELIS: Thank you. And also I would like to thank everyone for inviting Avaya to speak about regulatory considerations. In most cases we prefer to rely on market forces to guide our decisions about the products we should offer.

However, with regard to VoIP systems and services, it is clear that market forces alone will not protect the rights of individuals with disabilities.

The history of our Intuity voice-mail system may illustrate why we believe that some form of regulation is essential. In 1993 I helped design and build the TTY user interface for this system.

A key feature is that callers may select whether they wish to be prompted by voice or in TTY format. This means, of course, you can give the same phone number to voice and TTY callers.

Regardless of the prompting format, callers may leave voice or TTY messages. This TTY interface is a standard feature in the Intuity system. It is not an add-on, there is no license fee, there is no right-to-use fee.

The only thing a system administrator needs

to do is turn it on. Now, despite these efforts to encourage accessibility, we are finding that the vast majority of Intuity systems do not have TTY support activated.

It is clear that many organizations do not understand the need to provide accessible communication to their employees and to their customers.

In this environment we cannot expect that market pressures alone will ensure that VoIP systems are accessible. Before I discuss regulations that may be appropriate and beneficial, I think it's important to describe a few technical differences between traditional phone systems and VoIP.

When you have an active call on a standard residential telephone, all transmissions are carried on a single audio channel. This would include your voice, as well as touch tones and modem signals.

Many assistive devices, notably TTYs, rely on the phone system's ability to transmit audio information reliably and without distortion. In the present regulatory environment, VoIP audio channels are not required to support reliable TTY communication.

This is a problem because the voice

optimized audio compression commonly used in VoIP systems can decrease TTY accuracy to the point it becomes unusable.

An exciting aspect of VoIP technology is that even while a call is in progress, all sorts of non-audio information may be transmitted via parallel data channels.

Avaya is already using this capability to provide reliable transport of Baudot TTY signals on VoIP-wide area networks. So rather than transmit the TTY tones via the voice channel, a description of the tones is sent via a parallel data channel, the receiving system reconstructs the original audio tones for the TTY device at the far end.

And, for the benefit of any engineers in the audience, these descriptions are in the format specified by RFC 2833, and are sent redundantly to compensate for packet loss.

It works beautifully. The mechanism I just described brings our voice systems up to parody with traditional phone systems. VoIP technology allows us to considerably more.

A good example of software for Avaya IP telephones is provided by Avaya for free called Universal Access Phone Status. It takes advantage of

capabilities that are present in our IP telephones to provide, via voice output, all of the information that is presented visually to sighted users, such as which lines are available, which are in use, whether the phone is forwarded, whether there is new voice-mail, whether someone on hold has been disconnected.

In fact, over 200 different functions are supported by this product. My flow of the time, here are three high level recommendations regarding regulatory control of VoIP.

First, regardless of how the FCC eventually comes out on the issue of is VoIP a telecom or an information service, Avaya supports the idea that, at a minimum, the current accessibility requirements for traditional phone systems should be applied to VoIP.

In addition, we would like these regulations implemented at the Federal level, so that manufacturers won't have to deal with multiple standards and regulations that may be developed by the individual states.

Second, we believe that a barrier might develop between VoIP users and the users of traditional systems if interoperability and backward compatibility are not required.

I regard my third point as really being the

most important. We believe that if accessible VoIP systems cost more than their inaccessible equivalents, the FCC may be unable to guarantee the rights of people with disabilities regardless of whether VoIP regulations are adopted.

Previous statements from the FCC demonstrate that they have been reluctant, and appropriately so in my opinion, to require capabilities that are not readily achievable.

A key component of how the FCC defines readily achievable takes into account the cost of the incremental action. Now, the accessibility solutions I have described today are included in our products without additional charges or fees.

This was a priority for us during the design process. And we were able to achieve this by taking advantage of capabilities that were actually already present in our systems.

For example, the TTY on IP solution uses a mechanism that was implemented originally to transmit touch-tones on the internet. The TTY messaging system I described to you uses a software that was implemented originally to support multi-lingual spoken announcement sets.

How, this style of engineering, which we try

to piggy-back inexpensively onto existing capabilities, has a very important objective. Now, keep in mind, the cost component and how the phrase readily achievable is defined.

We believe that if accessible systems cost more than inaccessible equivalents this could lead to discrimination of the provision of services and opportunities for employment in organizations that are unable to or unwilling to cover the extra expense.

By reusing capabilities that were already present in our systems, we are providing accessible solutions for VoIP that are, by definition, readily achievable.

Now, realistically, it is not always possible to include accessibility within a standard product for no additional charge. However, one thing you can count on is that Avaya will always try.

Going forward, we look forward to working with the FCC and with the community in general to ensure that everyone's needs are respected and accommodated. Thank you.

MR. CARLISLE: Thank you very much Paul. Our next panelist is Paul Schroeder who serves as the Vice President of Policy Research and Technology for the American Foundation for the Blind.

He is responsible for AFB's activities related to legislative and public policy, research and demographic trends and efforts to improve access and information concerning technology.

He has been directly responsible for a number of significant developments, including helping to negotiate disability access language during the 1996 Telecom Act.

He has been a leading advocate in the effort to enact legislation that would improve access to text books for students who are blind or visually impaired. And he has also been a leading voice in AFB's work to foster a greater access to cell phones and other telecommunications equipment. Paul, thank you very much for being with us.

MR. SCHROEDER: Thank you, very much. And good afternoon. I want to observe that so far we have all been very nice and behaved. And I will try to keep to that.

I think it's kind of a suit and necktie phenomena that we are all kind of constrained from speaking perhaps directly. And I want to compliment Jim Tobias for A, not having a necktie, and B, being fairly provocative in some of his comments.

And I thought they were very well chosen.

And those of you who may have missed it, especially those listening on the web, check him out. They were good comments.

It's interesting that we saved the regulatory portion to last, and appropriately so. I think it's good that we've been able to talk about some of the other issues, including some of the great benefits that come from IP-enabled services.

I want to make a couple of observations. But first of all I want to commend the Commission for an excellent notice of conveying your usual breadth and depth of analysis.

Those of you who have maybe been daunted by its length or its topic, please read it. It's really tremendous. It's a great read. The layering discussion alone is almost Dostoevsky in tone.

You will enjoy it. It will be in literary classes next year I'm sure. It is a good notice. And I do commend it. We have heard a lot today about Voice Over IP.

And I want to express a concern that we are really talking about something far deeper and more significant in a way than that. Voice Over IP fits fairly well within the current telecom structure.

I think we can debate and argue over how it

should be deemed in the regulatory scheme. But I think we could probably come down and agree that it's a telecom service and should be treated as such.

IP-enabled services are far more significant, and really have to be treated differently. And that's one of the things I want to talk about.

How do we ensure that people with disabilities have reliable access to these IP services with all that comes with them? Well it should be no surprise to anyone here that I'm going to advocate, yes, regulations, to ensure reliable access for people with disabilities.

Voluntary measures and market forces simply don't work. Everybody wants them to work. Everybody says they should work. Everybody hopes they will work.

But they simply don't work for people with disabilities. So, even though we might say it over and over again, it isn't true. It hasn't been true, and I doubt for the foreseeable future that it will be true.

The reason for that is fairly simply. We simply don't have the sufficient focused power in the marketplace to ensure that services will meet our

needs.

So it seems to me the role of government, and in this case the FCC, is to ensure a reliable opportunity for equal access, albeit with minimal intrusion.

Striking that balance is the critical task confronting the Commission. I think we have a historic moment to try to construct the right regulatory approach that meets the needs of consumers with disabilities, rather than trying to shoehorn us into the unrelated legacy approaches of the past.

Of course I'm referring here to the computer inquiry lines of reasoning, and to the economic-based regulatory scheme that we have been living within. Whatever the flaws of the latter, the economic scheme, might be, certainly it has served important interest, especially in constraining the abuses that might arise for monopoly power.

But even in a non-monopoly condition, people with disabilities still do not have the power to negotiate the rates, the terms, and conditions that affect our access to services.

With respect to the computer inquiry decisions, one wishes we could have been around 40 years ago to try to steer things in a different

direction.

Nonetheless, most of us weren't, maybe a couple exceptions on this table since we've got a hundred years of service. We have said several times in our responses to notices here at the FCC, we have asked the FCC to try to go beyond, to try to move past the separation of basic and enhanced or telecom and information services that arose from the computer inquiry.

We've said that in our comments on the further notice of inquiry, Section 255, and we've also made the same point in talking about broadband services.

Obviously the analysis in the notice that Commission has published also points out that there is a rich communication environment, and an environment that does go well beyond the division of telecom and if services.

Nonetheless, I have to say at the heart of the discussion of regulatory schemes in the Federal Communications Commission notice, and in the comments here this afternoon, we have continued to focus on voice and made analogies to traditional voice telephony.

We have to move beyond the focus on voice.

And we have to get to a focus on the message, on the content, for it is the communication of that content that really is essential.

Yes, the transmission of voice is important, and it does need to be protected in terms of accessibility. But so many other forms of content described in the notice, and talked about in terms of the IP environment that we are now in, are of great significance to people with disabilities, and are simply not being made accessible.

I have no doubt that the marketplace will ensure a wide panoply of services and products for consumers. And I have no doubt that those providing those services will find a way to make money.

But experience tells us that the needs of people with disabilities, if thought of at all, will be addressed as afterthoughts, retrofits, and incomplete and inferior approaches.

We are not looking for an imposed solution. Nor do we want to be bought off with a scheme that says special devices for special people. So, how do we ensure that people with disabilities can take equal advantage of these new communications services?

Well, I'm going to say that I think Section 255 of the Communications Act actually offers the

right starting point. Yes, it does bear the struggles of having been written with a telecom and information services distinctions in place.

But it addresses the needs of consumers by addressing access to both equipment and telecommunications services. And it sets user interface standards.

Section 255 addresses that all important human interface to communications. Regardless of whether we are describing a traditional telephone, or whether we are describing something that, in fact, uses enhanced technologies.

I am convinced that standards can be set to require access to IP-enabled services, that we can look at end-user devices, those used by the consumers in their home or on their person, the controllers of those devices, be they personal computers, handheld devices or otherwise, the software that runs those services, the electronic services, such as the web-bases services that allow individuals to interact.

And, of course, we can ensure that the communication protocols are open so that consumers can connect at will. But, as I said, 255 is limited by its applications to telecommunications and, frankly, its neglect in the enforcement here at the Federal

Communications Commission.

Unfortunately, our hopes have not been realized. But I believe that the breadth and approach of 255 remains right. We've gone nearly this time -- and I'm closing up here -- without using the term ancillary jurisdiction.

And I can't believe we have gone a whole morning without saying that. It's the right regulatory edifice on which to build a 255-like approach to ensure broad access to IP communications and technologies for people with disabilities.

MR. CARLISLE: We'd like to get people warmed up for a while before we actually start throwing around ancillary jurisdiction. By the way, thank you very much.

That's the first time I've ever heard a, speaking on behalf of the staff who wrote the NPRM, that's first time I've ever heard any part of an FCC order referred to as Dostoevskian.

We usually get Kakkaesque. And it's really not that long. It's only about 60 pages long, which is actually a pamphlet compared to most of what we do. And one more thing, before I take anymore heat on this hundred year comment, I'm just going by the bios.

And Vanderheiden has been in this for 30

years. Mr. Schroeder has been in it for 20 years from his bio, Michaelis for 25, and Mr. Bosson has been head since 1990 of the Texas TRS Service, and has probably got more experience than that.

So, you've at least got 89 years by my account. So just put that to rest. Our last panelist is Dr. Gregg Vanderheiden who we are very happy to have again.

He was on our VoIP forum in December of last year, and provided very valuable input on the disabilities access issues. So we are very happy to have him back again so we can delve into more detail in this forum here.

He is a Professor in Industrial Engineer and Biomedical Engineering, and directs the Trace Research and Development Center at University of Wisconsin in Madison.

Dr. Vanderheiden has been working in this field for, as I mentioned, 30 years. He pioneered the field of augmentative communication and assistive technology, and for many years has been looking at issues for physical and cognitive disabilities.

He has been involved with computer access since the late 1970s. And many access features he has developed are present in Mac, UNIX, and Windows

operating systems.

He has worked with a wide variety of Federal Government agencies, as well as corporations. His recent activities focus on cross disability access to the full range of communication and information technologies.

He is the co-author of W3C's web content accessibility guidelines, various interconnection standards, and voting systems that are usable by those with disabilities, or elderly.

Again, we are very happy to have him. And, please?

MR. VANDERHEIDEN: Thank you very much. Again, thank you for the invitation and for putting together this very excellent panel. Coming last is always a dubious distinction.

And I will try not to plow old ground. But I will try to bring some things together and to really look at some of the underlying forces that cause things to happen or not happen.

So I ask the question, why would we regulate? And the answer is we wouldn't or shouldn't unless we have to. So, is this true for Voice Over IP and for IP services?

And let's examine this. One of the things

we saw was in the telecom area we have seen nothing happen regarding accessibility and mainstream companies and products until regulation.

Although there were serendipitous things, and there were special programs, sometimes special adaptations in special room. But we haven't seen anything regarding overall access to the different disabilities and the problems they face.

With regulation, we also saw that nothing substantial happened that hasn't been driven by FCC enforcement or threat of enforcement. And so when that has either relaxed or time has passed, the interests and the efforts in the companies can actually be seen to slacken and reduce.

When a complaint is filed, interest, activities, funding, and work within the companies increases again. Now, is this because the companies are bad, or evil?

And the answer is no. It's complicated, but the underlying driving force is that it is not good business to do things that do not generate the most profit.

This is a very competitive industry. And those who ignore this, the laws of business, they are gone, they disappear. And we here who buy stocks --

anybody here buy stocks or have a pension fund?

We want our stocks to generate as much return as possible. So if you're like we, the public, are the evil owners of these companies that care about nothing but profit.

So profit isn't bad, it's life. It's like gravity. If you're old and you fall and you break your hip, you kind of curse gravity. But if you didn't have gravity you wouldn't have traction, you couldn't walk.

Profits are similar to gravity. They are both a fact, and they are what makes things work. We ignore gravity at our own peril. We ignore the profit motive and its driving and critical force in business, at the peril of actually the consumer.

If we think that things will happen for the consumer for any other reason except if they need to, then we basically are ignoring gravity. So what does this have to do with regulation?

Regulations are a way of taking important things that won't and don't happen by market forces, that aren't in the profit equation, and putting them into the profit equation.

Profit is what makes businesses work. Regulation is how society, and what society uses to